

**THE
ONTARIO WATER RESOURCES
COMMISSION**

REPORT ON

**LABORATORY LIBRARY
ONTARIO WATER RESOURCES COMMISSION**

**A
WATER RESOURCES SURVEY
COUNTY OF ESSEX**

**A SURVEY OF WATER RESOURCES
AND STREAM POLLUTION WITH
RECOMMENDED PROGRAM**

MARCH 1959

MOE
ESS
WAT
AQKO

c.2
a aa

PARLIAMENT BUILDINGS - TORONTO

Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact ServiceOntario Publications at copyright@ontario.ca

LABORATORY LIBRARY
ONTARIO WATER RESOURCES COMMISSION

WATER RESOURCES SURVEY

County of Essex

A survey of water resources
and stream pollution with
recommended programs

Date: March, 1959.



Environment Ontario
Laboratory Library
125 Resources Rd.
Etobicoke, Ontario M9P 3V6
Canada

MOE
ESS
WAT
AQKO
c.2

aqko

WATER RESOURCES SURVEY

- County of Essex -

INDEX

CHAPTER 1

	Page
Summary and Recommendations	1
Summary	1
Recommendations	2
(1) City of Windsor	3
(2) Town of Amherstburg	4
(3) Town of Essex	4
(4) Town of Harrow	4
(5) Town of Kingsville	5
(6) La Salle (part of Sandwich West Township)	5
(7) Town of Leamington	5
(8) Town of Riverside	5
(9) Town of Tecumseh	6
(10) Village of Belle River	6
(11) Village of St. Clair Beach	6
(12) The Township of Anderdon	6
(a) Edgewater Beach	6
(b) McGregor	6
(13) Township of Gosfield South	6
(a) Cedarhurst Park and Cedar Island	6
(14) Township of Sandwich East	7
(15) Township of Sandwich West	7
(16) Township of Tilbury North	7

CHAPTER 2

Geography and Geology	8
I Geography	8
1. Topography	8
2. Drainage	8
3. Climate	9
4. Agriculture	9
5. Population	9
II Geology	10

CHAPTER 3

City of Windsor	11
I Water Supply	11
1. Source	11
2. Pumpage	11
3. Treatment	12

	4. Distribution	Page 13
	5. Potential Additional Supplies	13
II	Water Requirements of the Future	13
	(a) Windsor	14
	(b) Windsor and adjoining Municipalities	14
III	Water Pollution	15
IV	Recommendations for Water Development	16
V	Recommendations for Pollution Control	17

CHAPTER 4

	Towns	18
	Amherstburg	18
I	Water Supply	18
	1. Source	18
	2. Pumpage	18
	3. Treatment	18
	4. Distribution	19
	5. Potential Additional Supplies	19
II	Water Requirements of the Future	19
III	Water Pollution	20
IV	Recommendations for water Development	20
V	Recommendations for Pollution Control	21
	Essex	21
I	Water Supply	21
	1. Source	21
	(a) Wells	21
	(b) Essex County Union Water System	22
	2. Pumpage	23
	3. Treatment	23
	4. Distribution	24
	5. Potential Additional Supplies	24
	(a) Ground water	24
	(b) Surface Water	24
II	Water Requirements of the Future	24
III	Water Pollution	25

(3)

	Page
IV Recommendations for Water Development	25
V Recommendations for Pollution Control	25
Harrow	26
I Water Supply	26
1. Source	26
2. Pumpage	26
3. Treatment	27
4. Distribution	27
5. Potential Additional Supplies	27
(a) Ground Water	27
(b) Surface Water	27
II Water Requirements of the Future	28
III Water Pollution	28
IV Recommendations for Water Development	28
V Recommendations for Pollution Control	29
Kingsville	29
I Water Supply	29
1. Source	29
2. Pumpage	29
3. Treatment	29
4. Distribution	30
5. Potential Additional Supplies	30
II Water Requirements of the Future	30
III Water Pollution	31
IV Recommendations for Water Development	32
V Recommendations for Pollution Control	32
La Salle	32
Water Supply	32
1. Source	32
2. Pumpage	33
3. Treatment	33
4. Distribution	33
5. Potential Additional Supplies	33
II Water Requirements of the Future	33

	Page
III Water Pollution	34
IV Recommendations for Water Development	34
V Recommendations for Pollution Control	35
Leamington	35
I Water Supply	35
1. Source	35
2. Pumpage	36
3. Treatment	36
4. Distribution	36
5. Potential Additional Supplies	37
II Water Requirements of the Future	37
III Water Pollution	38
IV Recommendations for Water Development	39
V Recommendations for Pollution Control	39
Ojibway	39
I Water Supply	39
II Water Requirements of the Future	39
Riverside	40
I Water Supply	40
1. Source	40
2. Pumpage	40
3. Treatment	40
4. Distribution	41
5. Potential Additional Supplies	41
II Water Requirements of the Future	41
III Water Pollution	41
IV Recommendations for Water Development	42
V Recommendations for Pollution Control	42
Tecumseh	42
I Water Supply	42
1. Source	42
2. Pumpage	43
3. Treatment	43
4. Distribution	44
5. Potential Additional Supplies	44

II	Water Requirements of the Future	Page 44
III	Water Pollution	45
IV	Recommendations for Water Development	45
V	Recommendations for Pollution Control	45

CHAPTER 5

Villages

	Belle River	
I	Water Supply	46
	1. Source	46
	2. Pumpage	46
	3. Treatment	46
	4. Distribution	46
	5. Potential Additional Supplies	47
II	Water Requirements of the Future	47
III	Water Pollution	47
IV	Recommendations for Water Development	48
V	Recommendations for Pollution Control	48
	St. Clair Beach	49
I	Water Supply	49
	1. Source	49
	2. Pumpage	49
	3. Treatment	49
	4. Distribution	49
	5. Potential Additional Supplies	49
II	Water Requirements of the Future	50
III	Water Pollution	50
IV	Recommendations for Water Development	50
V	Recommendations for Pollution Control	51

CHAPTER 6

	Page
Townships	52
I Water Supply	52
Cedarhurst Park and Cedar Island	53
Comber	53
McGregor	54
Stoney Point	54
Sandwich East	55
Sandwich West	56
Essex County Union Water Supply	57
II Water Pollution	58
Township of Anderdon	59
Edgewater Beach	59
McGregor	59
Township of Gosfied South	60
Cedarhurst Park a d Cedar Island	60
Township of Sandwich East	60
Township of Sandwich West	62
Township of Tilbury North	63

- FIGURES -

1. Essex County	10
2. Essex County - Drainage Plan	10
3. Essex County Stream Pollution Survey	10
4. Town of Essex	22
5. Essex County Union Water System	58

- TABLE -

1. Analyses of Pollution Survey Samples	10
---	----

INTERPRETATION OF ANALYSES

For convenience in the interpretation of laboratory analyses it may be taken as an objective that pollution in streams should not exceed the following figures ---

B.O.D. (Biological Oxygen Demand) 4 ppm.(parts per million)
Coliform Counts (M.P.N. - Most Probable Number) 2400

Similarly the effluents from drains or sewage plants should have, as objectives, figures not in excess of the following ---

B.O.D. 15 ppm.
S.S. 15 ppm.

WATER RESOURCES SURVEY

- COUNTY OF ESSEX -

CHAPTER 1

SUMMARY and RECOMMENDATIONS

SUMMARY

This report records the results of a preliminary survey of water supply and stream pollution in the County of Essex made by the Ontario Water Resources Commission. Attention has been given to the sources of water supply, treatment, distribution, and future water requirements of the municipalities. Since the control of pollution is closely related to the use of water, its effect on the streams and lakes have been examined. This must be regarded as most important to the welfare and future development of the county.

A summary of the results of this survey is as follows:

1. Approximately eighty-five percent of the population in the county is served by municipal water works systems. As the Essex County Union Water System, and other systems, are extended this proportion of the population not served from municipal supplies will decrease.

2. Essex County is one of the most agriculturally productive counties in the Province. It is also one of only two counties which are almost completely surrounded by bodies of water. Adequate supplies of water should, therefore, be available for domestic, industrial and agricultural uses in the county.

3. Much has been accomplished already in this county in the development of municipal water supply systems. Plans are well advanced to extend water works to serve larger areas.

4. Geological conditions in many sections of the county are not favourable for the development of ground water supplies. About thirty-one per cent of the wells drilled for water are inadequate, due mainly to hydrogen sulphide in the water.

5. Problems of water supply in the county are almost entirely related to distribution. Some of these involve considerable extensions of feeder mains to serve scattered communities. Others concern the more highly populated areas in the municipalities of Riverside, Tecumseh and the Townships of Sandwich East and Sandwich West.

6. While the county has been progressive in attacking its water supply problems, the programme of pollution control has not advanced beyond the planning stage. Pollution is widespread, affecting inland watercourses and bordering bodies of water. These investigations have shown contamination in the streams and lakes to be due to the discharges of both sanitary and industrial wastes. Improvements in these conditions could be accomplished by the enforcement of septic tank by-laws and regulations already in effect along with provision for adequate sewage works.

RECOMMENDATIONS

The conclusions and recommendations based on this survey of water resources in the county are:

1. Planning should be continued to meet the water needs of the urban and rural areas of the county in an effort to ensure that adequate supplies of good quality water will be available for its future growth.

2. Pollution control measures in all surface waters must be aggressively undertaken to insure the maximum beneficial use of these water resources at all times, to protect public health, and to maintain best sanitary conditions.

3. Action on water supply and pollution programmes in the different municipalities is recommended as follows:

(1) City of Windsor

- (a) - The Windsor Utilities Commission continue to plan its water treatment and distribution works to serve the city and the adjoining municipalities. Continuous contact with this problem should be maintained in co-operation with the individual municipalities to determine the best ways in which these plans can meet the future water demands. This study could outline the eventual limits of the Windsor water service area, allowing both the city and the neighbouring areas to plan their future developments.
- (b) - Engineering studies be concluded as soon as possible on the design and cost of sewage works for the consideration of the participating municipalities, and early action be taken on the construction of these necessary works. These studies would indicate which portions of Sandwich East and Sandwich West Townships and the neighbouring towns would be served by a central treatment plant and which by other treatment plants.

(2) Town of Amherstburg

- (a) - Steps be taken to ensure that the expanding water **needs** of the town and surrounding township areas can be met in the future.
- (b) - A sewage works programme including trunk lines and treatment be undertaken immediately for the town, along with certain portions of Malden and Anderdon Townships.
- (c) - Industrial wastes be included for treatment in the proposed municipal plant. Where this arrangement is not practical an individual treatment and disposal system will be required.

(3) Town of Essex

- (a) - Supplies of water continue to be obtained from Lake Erie through the Essex County Union Water System.
- (b) - Sewage works be provided to treat the sanitary wastes from the Town of Essex.
- (c) - Secondary treatment of industrial waste from the Stokely Van Camp of Canada, Limited be provided by spray irrigation or by other effective measures.

(4) Town of Harrow

- (a) - The water supply continue to be obtained from Lake Erie through the recently constructed water works system.
- (b) - A municipal sewage works programme be initiated to treat sanitary wastes.

- (c) - The entire canning waste from the W.Clark, Limited canning factory be treated by the spray irrigation method.

(5) Town of Kingsville

- (a) - An engineering report be prepared on the Kingsville water works to plan for future needs of the municipality.
- (b) - A sewage works programme be initiated to control all waste in the Kingsville area including the suburban portions of Gosfield South Twp.

(6) La Salle (part of Sandwich West Township)

- (a) - The future supply of water be obtained from the Windsor system.
- (b) - A sewage works programme be undertaken by the town to eliminate undesirable conditions resulting from the discharge of sanitary wastes.

(7) Town of Leamington

- (a) - Future water needs of the town be met with water from the Essex County Integrated Water System.
- (b) - Sewage treatment works be undertaken to eliminate pollution of Lake Erie in the vicinity of the town including parts of Mersea township.

(8) Town of Riverside

- (a) - The future water requirements of the town be developed as needed from the Detroit River.
- (b) - The existing sewage treatment plant be abandoned and a new sewage treatment plant be constructed to correct pollution in Little River and Lake St. Clair in the vicinity of Riverside.

(9) Town of Tecumseh

- (a) - A sewage works programme be undertaken by the town to eliminate the discharge of sewage into Lake St.Clair.

(10) Village of Belle River

- (a) - Future requirements for water be met through the development of the existing water works system.
- (b) - A sewage works programme be undertaken to eliminate pollution existing in the vicinity of the village.

(11) Village of St.Clair Beach

- (a) - The supply of water to serve the village be obtained through the Tecumseh water system.
- (b) - Close supervision of private disposal systems be maintained by village officials to control pollution in Pike Creek and Lake St.Clair.

(12) Township of Anderdon

- (a) - Edgewater Beach The installation of all private septic tank systems be made to conform to provincially recommended standards, or a sewage works system be provided.
- (b) - McGregor The possibility of utilizing wells as a source of supply for a water works system be investigated. A sewage lagoon be provided to treat the sewage from this community.

(13) Township of Gosfield South

- (a) - Cedarhurst Park and Cedar Island Consideration be given to the supply of water from a central

water works system. Supervision be given to the installation of septic tanks, and consideration be given to providing sewage works.

(14) Township of Sandwich East

- (a) - Plans be prepared for the systematic installation of large diameter feeder water mains.
- (b) - A joint sewage treatment system be constructed as far as feasible to serve the City of Windsor and suburban areas, treatment to be provided by one of more plants as may seem advisable.

(15) Township of Sandwich West

- (a) - The construction of sewage works to serve the Township be undertaken jointly with the City of Windsor and other suburban areas, treatment to be in one or more plants as may seem advisable.

(16) Township of Tilbury North

- (a) Stoney Point - Action be taken to eliminate pollution from the municipal drain between lots 6 and 7.

WATER RESOURCES SURVEY

- COUNTY OF ESSEX -

CHAPTER 2

GEOGRAPHY AND GEOLOGY

I Geography

1. Topography

Essex County is predominantly a plain with the only major form of relief in the Leamington-Ruthven area. Lake St.Clair to the north and Lake Erie to the south have elevations of 576 and 572 feet above sea level, respectively. Between these two lakes the range in elevation is from 572 feet to over 725 feet, although it seldom rises to more than 650 feet above sea level.

The present topography of the county in its final form is the result of the erosion and deposition by glaciers and glacial lakes which covered the area several thousand years ago. The flat-lying areas are clay and till plains while the upland area northwest of Leamington is the eroded remnant of a delta formed in a glacial lake. Old gravel bars and spits are in evidence as long ridges around the end moraine which is parallel to the shore of Lake Erie in the south.

Cliffs along the Lake Erie shore are not as high as those in the adjacent county of Kent. The bluffs reach a maximum height midway between Kingsville and Leamington.

Point Pelee is a sand spit which has been built through wave and current action along the shore of the lake.

2. Drainage

Most of the larger rivers and creeks flow northerly into Lake St.Clair or westerly into the Detroit River. The Belle

and Ruscom Rivers which flow to the north drain a large portion of the central part of the county while the Canard River, which empties into the Detroit River, drains the west central region. Rivers and creeks flowing into Lake Erie are relatively short. Cedar Creek and Big Creek are the largest of these.

The flatness of the land and the heavy texture of the soils provide a poor drainage surface. Drainage is assisted by numerous ditches and channels which have been dug throughout the county.

3. Climate

The location of Essex County in the most southerly part of the province accounts for its relatively warm climate. The annual average maximum and minimum daily temperatures are 57° and 40° Fahrenheit, respectively. The average annual precipitation varies throughout the county. It is 25.11 inches at Harrow, 28.83 at Leamington, and 31.13 at Windsor.

4. Agriculture

Essex is one of the intensively farmed counties in Ontario. Cash crops and mixed farming both play important roles in the agriculture of the area.

Frequently a deficiency of precipitation occurs during the latter part of the growing season which is overcome in some areas by irrigation systems.

5. Population

The population of the County of Essex in 1957 was 248,797. In 1931 it was 57,392. The increase has been steady and may be attributed to the agricultural and industrial development of the county.

II Geology

A variable thickness of overburden overlies the bedrock formations of the Devonian System. The bedrock is composed mainly of grey and buff limestones with occasional banks of dark shale, dipping gently to the east. The Delaware and Detroit River formations underlie the overburden in most parts of the county.

In general the water bearing characteristics of the bedrock are poor. Most of the wells obtain their water from the upper few feet of the rock. Mineralized waters are common and seem to be related to the Dundee Formation. Records show that approximately 30 per cent of the rock wells drilled in the past few years have yielded mineral water.

The overburden consists largely of clay or clay till which is sometimes interbedded with sand formations. The sandy members are present in greater thicknesses in the Leamington area where they predominate over the clays and often form excellent aquifers. About 80 per cent of the drilled wells in the county obtain water in the bedrock.

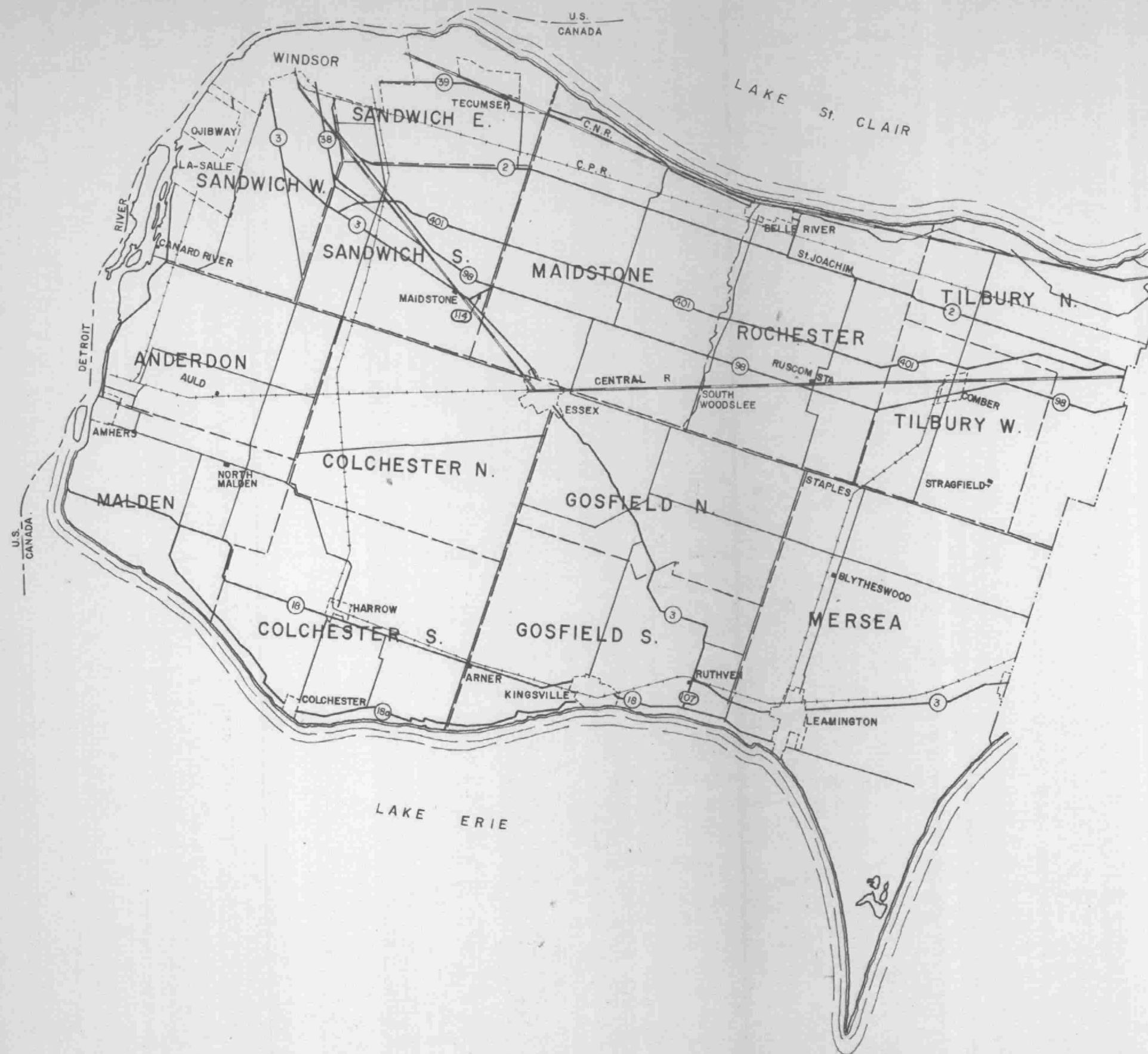


FIG. 1
ESSEX COUNTY
 SHOWING MUNICIPAL BOUNDARIES
 SCALE 1" = 4 MILES
 OWRC. TORONTO Aug 1958 S.H.

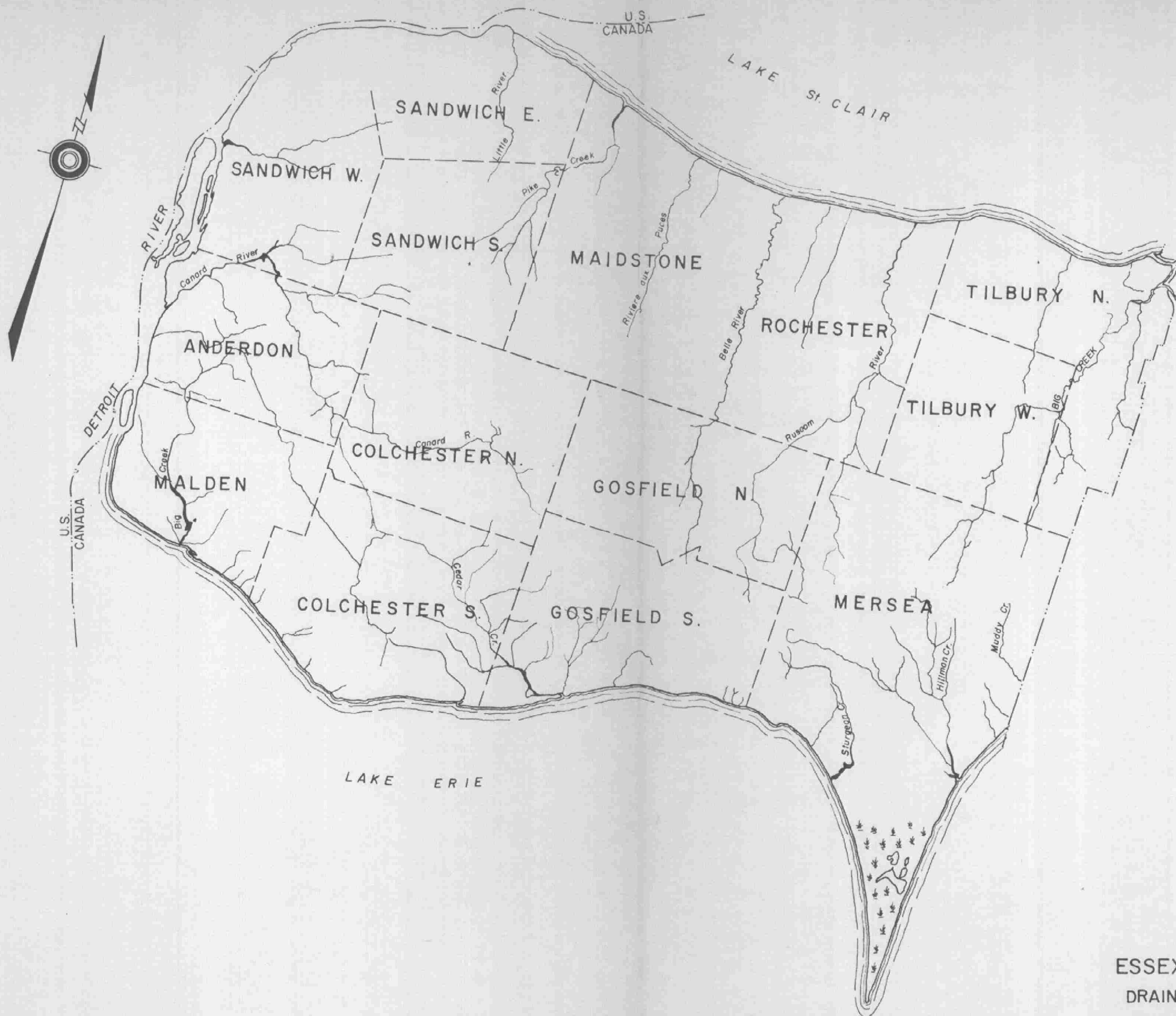


FIG. 2
ESSEX COUNTY
DRAINAGE PLAN

SCALE 1" = 4 MILES
OWRC. TORONTO. Aug 1958 S.H.



LEGEND.
CDE 1.0 STREAM SAMPLING POINTS
ED 4 ESSEX DRAINS

FIG. 3
ESSEX COUNTY
STREAM POLLUTION SURVEY
SCALE 1" = 2 MILES

TABLE 5 ANALYSIS OF POLLUTION SURVEY SAMPLES

SAMPLING POINTS	MILEAGE	LOCATION	B.O.D.	SOLIDS (P.P.M.)		MEMBRANE FILTER		INDICATED NUMBER PER 100 M.L.
			(P.P.M.)	TOTAL	SUSP.	DISS	COLIFORM COUNT PER 100 M.L. (M.P.N.)	
R I V E R S I D E								
L. 0.0	0.0	LITTLE RIVER JUNCTION LAKE ST. CLAIR	24.0	512	306	236	107,600	
S A N D W I C H E A S T								
L. 1.9	1.9	LITTLE RIVER AT BRIDGE ON TECUMSEH RD.	25.0	316	8	308	5,250	
ED. 9		GRAND MARAIS DRAIN $\frac{1}{4}$ MILE EAST OF ALEXIS RD. ON GRAND MARAI S RD.	290	870	404	466	< 10	
ED. 10		BOUNDARY SANDWICH EAST AND WINDSOR. WOLLATT CONCRETE PLANT AT ALEXIS RD. ON GRAND MARAI S RD.	144	582	336	846	110	
ED. 11		WALKER RD. BRIDGE AT GRAND MARAI S DRAIN	49	356	84	272	>15,000	
ED. 12		HOWARD AVE. BRIDGE BORDER OF SANDWICH EAST & SANDWICH WEST.	37	414	74	340	>15,000	
W I N D S O R								
MC. 0.5	0.5	MCKEE CREEK AT CITY DUMP	4.2	10,774	352	10,422	220	
L A - S A L L E								
T. 0.0	0.0	MOUTH OF TURKEY CREEK	48	404	112	292		
T. 0.1	0.1	MOUTH OF TURKEY CREEK	9.0	386	36	350	24,000	10,000
T. 2.0	2.0	BELOW JUNCTION OF GRAND MARAI S DRAIN AND TURKEY CREEK.	20	405	24	362	24,000	10,000
S A N D W I C H W E S T								
ED. 13		HURON LINE, SOUTH OF GRAND MARAI S ROAD.	14	462	20	442	>15,000	
ED. 14	7	ELLOITT RD. BRIDGE ABOVE JUNCTION WITH TURKEY CREEK	6.2	442	20	422	> 15,000	
ED. 15		SPENCER ROAD AT LENNON DRAIN	15	538	22	516	> 300	
ED. 16		LENNON DRAIN AT HOWARD AVE.	5	594	70	524	29,200	

S A N D W I C H W E S T (CONT'D.)

ED. 17		GRAND MARAIS DRAIN SOUTH OF MICHIGAN CENTRAL RAILWAY	28	602	144	458	141,000
TN. 1.9	1.9	TURKEY CREEK AT ROSELAND GOLF CLUB, KENNEDY DRIVE WEST AT MCGREGOR BLVD.	4.7	392	14	378	-----
TN. 4.3	4.3	TURKEY CREEK AT HURON LINE ROAD BRIDGE (HIGHWAY #3)	6.0	404	4	400	< 10
TS. 5.0	5.0	HIGHWAY #3, 1/2 MILE BELOW TURKEY CREEK	4.2	330	32	348	565

A N D E R D O N

C. 1.5	1.5	CANARD RIVER AT HIGHWAY #18 BRIDGE.	4.0	272	98	174	480
C. 3.5	3.5	CANARD RIVER AT 2ND BRIDGE ON CONCESSION WEST OF LUCKERVILLE.	4.0	836	68	768	20
CN. 7.8		CANARD RIVER AT BRIDGE ON ROAD TO HWY. #18 THROUGH LUCKERVILLE (TOWN LINE)	2.0	664	2	662	775

C O L C H E S T E R N O R T H

CE. 11.6	11.6	CANARD RIVER, AT 2ND BRIDGE NORTH OF LESLIE'S CORNERS OF HIGHWAY FROM HARROW	3.4	674	130	544	580
C. 12.2	12.2	CANARD RIVER, AT 1ST BRIDGE NORTH OF LESLIE'S CORNERS ON HWY. FROM HARROW	5.4	628	34	594	320

M A I D S T O N E

P. 3.6	3.6	PIKE CREEK AT HWY. #39	11	1,042	158	884	< 100
P. 0.0	0.0	PIKE CREEK AT JUNCTION WITH LAKE ST. CLAIR	6.4	494	100	394	< 100
PU. 0.1	0.1	MOUTH OF PUCE CREEK	9.5	664	156	508	800
PU. 6.3	6.3	PUCE CREEK AT HWY.#9C BRIDGE	21.0	2,040	76	1,964	2,800
ED. 1		ESSEX TOWN - MUNICIPAL SEWER OUTLET	146	1,574	14	1,560	3,400
ED. 2		4TH CONCESSION DRAIN AT JUNCTION OF LAKE ST. CLAIR	18	594	62	532	< 2

MAIDSTONE (CONT'D.)

B. 0.0	0.0	BELLE RIVER - BELOW VILLAGE OF BELLE RIVER AT HWY. BRIDGE	3.8	542	64	478	<	2
B. 1.5	1.5	BELLE RIVER - ABOVE VILLAGE OF BELLE RIVER.	16.0	568	92	476	<	2
B. 5.0	5.0	BELLE RIVER AT #401 HWY. BRIDGE	5.4	838	128	710		232

ROCHESTER

D. 0.0	0.0	DUCK CREEK AT RIVY BRIDGE NEAR MOUTH	7.2	384	10	374		4
M. 0.2	0.2	MOISON CREEK AT RIVY BRIDGE JUST ABOVE MOUTH	2.0	176	56	120	<	2
R. 0.5	0.5	RUSCOMB RIVER RUSCOMB BRIDGE ABOVE JUNCTION	4.6	548	152	396		2
R. 6.0	6.0	RUSCOMB RIVER AT HWY. #401 BRIDGE	2.0	600	68	532		1,412

TILBURY NORTH TWP.

SP. 0.9	0.9	CREEK AT BRIDGE ON HWY EAST OF STONY POINT VILLAGE	6.5	410	10	400	<	2
---------	-----	---	-----	-----	----	-----	---	---

MERSEA TWP.

MU. 0.3	0.3	CREEK AT BRIDGE ABOVE WHEATLEY FISHERIES	43.0	562	220	342		10
HE. 1.3	1.3	HILLMAN CREEK EAST BRANCH AT BRIDGE ONE MILE EAST OF HILLMAN.	3.2	756	150	606	<	2
HW. 2.8	2.8	HILLMAN CREEK - WEST BRANCH AT BRIDGE ONE MILE NORTH OF HILLMAN.	5.4	982	412	570		2
ED. 3		SELKIRK DRAIN - ONE MILE EAST OF LEAMINGTON ON CONCESSION ROAD.	48.0	608	58	550	<	2
ST. 1.9	1.9	STURGEON CREEK - 2 MILES EAST OF LEAMINGTON.	6.4	554	46	508		64
ED. 4.0		SELKIRK DRAIN AT BRIDGE LAKE ERIE,	39.0	536	100	436	<	2
ED. 5.0		STREAM AT BRIDGE ON HWY. 18 - 1½ MILES WEST OF LEAMINGTON	20	944	136	808		9,100
ED. 6.0		STREAM AT BRIDGE ON HWY. 18 - 2½ MILES WEST OF LEAMINGTON	18	640	128	512		4,473

G O S F I E L D S. T W P.

ED. 7.0		STREAM AT BRIDGE ON HWY. 18 - $\frac{3}{4}$ MILE FROM HWY. #107.	2.2	596	46	550	<	2
ED. 8.0		STREAM AT BRIDGE CLOSE TO HWY #107.	2.0	802	132	670		8,900
ML. 0.2	0.2	<u>MILL CREEK</u> - AT LAKEVIEW PARK KINGSVILLE.	89.0	480	50	430		146
ML. 1.5	1.5	<u>MILL CREEK</u> ABOVE TOWN	2.2	436	16	420		8
CDE. 0.3	0.3	CREEK - ONE MILE WEST OF KINGSVILLE ON HWY. 18 AT BRIDGE	2.8	594	54	480		4
CD. 0.1	1.0	<u>CEDAR CREEK</u> AT BRIDGE	8.0	658	46	612	<	2

WATER RESOURCES SURVEY

- COUNTY OF ESSEX -

CHAPTER 3

The water resources of each municipality are considered separately in the different sections of this report. All aspects of water supply, treatment and pollution are reviewed, and recommendations made with regard to future water development and pollution control. The City of Windsor is considered first, followed by the towns, villages and townships. The locations of these are shown in Figure 1. Figure 2 shows the main drainage courses in the county. The locations of sampling stations and the results of the analyses of the samples are shown in Figure 3 and Table I, respectively.

CITY of WINDSOR

I Water Supply

1. Source

The City of Windsor obtains water from the Detroit River. An adequate amount of good quality water is available from this source. Two intakes are located upstream near the easterly limits of the city.

2. Pumpage

The Windsor Utilities Commission supplies water to five neighbouring municipalities in addition to the city. The following tables list the averages of the amounts of these pumpages and the daily per capita consumption.

Average Daily Consumption (Gallons)

Area	1938	1957	Percent of Increase	Percent of 1938	Total 1957
Windsor	7,682,000	13,900,000	82	93	83
* Four municipalities	598,000	2,835,000	370	7	17

* Includes: Sandwich West, Sandwich East, Ojibway, Riverside (West of Little River)

Average Daily Per Capita Consumption (Gallons)

Area	1938	1957	Percent of Increase
Windsor	74	115	55
5 municipalities	52	54	4

The above figures indicate an 82 per cent increase in the Windsor water consumption from 1938 to 1957. In the same period the increase in population has been 17 per cent. The per capita consumption of the surrounding area is predominantly domestic and has remained fairly constant over the 20 year period. It is assumed, therefore, that the increased consumption in Windsor is largely attributable to industrial growth.

At present the four municipalities consume 17 per cent of the total water pumped. This is largely domestic as indicated by the low per capita consumption of 54 g.p.d.

3. Treatment

The treatment consists of mixing with alum, settling, filtration and pre and post chlorination. The raw water is amenable to economic treatment. There are intermittent treatment problems due to algae and the occurrence of very fine particles in suspension. The algae shorten the filter

runs, and the fine particles are difficult to settle.

In addition to the above naturally occurring conditions, there are the occasional taste and odour problems which result from the industrial waste contaminants in the river water. The most troublesome of these is caused by phenols. The existing treatment together with controls provided by industry have aided in reducing these problems.

4. Distribution

The distribution system in Windsor consists of some 220 miles of cast iron, steel and reinforced concrete mains. These vary in diameter from 4 to 42 inches. The pressure and the quantity available within the city are adequate. There are 28,013 services in the system, and these are all metered.

In order to provide adequate pressure for the increasing water demands in the suburban areas, a program of laying large diameter mains has been undertaken.

5. Potential Additional Supplies

The present source of water supply is adequate. Provided domestic and industrial pollution upstream from the intakes is controlled, there should be no need to consider an alternative source.

II Water Requirements of the Future

It is difficult to assess the future needs of the city due to recent proposals by some of the bordering municipalities to establish their own water treatment facilities. For this reason, an estimate has been made of the water requirements for the City of Windsor alone and for the city along with those five municipalities presently being supplied.

(a) Windsor

The average daily water consumption in the city during 1957 was 13,990,000 gallons. This water was used as follows: domestic 43 percent, industrial 35 percent, and commercial 22 percent. An estimate of future water needs might be based on the rate of increase in water consumption over the last 20 years as given in the preceding table. There has been less than 2 percent increase in population in the city within the last 10 years. Therefore, most of the increase in water consumption would likely have taken place between 1938 and 1948. Assuming the rate of increase in population will continue as it has in the last ten years, an estimate of water consumption by 1976 would be approximately 17 M.G.D.

(b) Windsor and Adjoining Municipalities

The suburban population supplied by the Windsor Utilities Commission in the years 1938 and 1957 was 11,600 and 54,666 respectively. This represents an increase of 370 percent in a 20 year period. Similarly the anticipated population by 1976 would be 258,000. On the basis of 100 gals. per capita per day the average daily consumption of this suburban population would be 25,800,000 gallons. This estimate, of course, is based only on projecting the trend of the past 20 years and is subject to modification by the various forces affecting the economic development of the community.

Two possibilities should then be considered in appraising future water requirements. In the first case the water treatment and distribution facilities should provide for an average daily consumption of 17 M.G.D. at the end of a 20

year period. If the needs of the city and the four adjoining municipalities are considered 43 M.G.D. of water would be required.

A decision of the Ontario Municipal Board on January 5, 1959 on Windsor - Sandwich West water rates directed that the rate charged by the City of Windsor for water be 20 cents per 1000 imperial gallons. This decision may affect future planning.

III Water Pollution

All municipal sanitary sewage in the City of Windsor is discharged untreated to the Detroit River. This creates considerable pollution in the river and prevents full utilization of the water by other persons downstream. This fact is emphasized by the International Joint Commission's Report on Boundary Water Pollution in 1951. On this report it is noted that the B.Coli count at the head of the Detroit River was approximately 5 per 100 cc. and in the lower portions below Amherstburg it reached 10,592 B.Coli per 100 cc. The B Coli count is an indicator of domestic sanitary wastes. This shows that the coliform pollution in the river increased some 2,000 times in passing through Detroit and the Windsor area at the time of that study.

The raw water at the present intakes for the Windsor filtration plant is relatively free of shore pollution. However, it should be realized that no water supply from the Detroit River will remain satisfactory unless adequate sewage works are constructed and maintained by expanding upstream municipalities and industries.

A number of tributary drainage courses receive pollution from industrial and sanitary waste outlets. A sample taken from McKee Creek at the Windsor refuse disposal area indicated some contamination.

Sampling Points	Mile- age	Location	B.O.D. (ppm.)	Total	Solids(ppm) Susp. Diss.		Membrane Filter Coliform Count (M.P.N.)
MC 0.5	0.5	McKee Cr. at city dump	4.2	10,774	352	10,422	220

The existing sewerage system for the City of Windsor is well summarized in the "City of Windsor Report on Sewage Disposal", 1954, by Gore & Storrie, Limited, Consulting Engineers. The report recommends the installation of primary treatment works to serve the city to be constructed in three parts. These parts with estimated costs are as follows:

- | | |
|---|-------------|
| (1) Relief interceptor sewers | \$8,640,000 |
| (2) Large interceptor sewer along
the river (30,000 feet) | \$5,500,000 |
| (3) Primary sewage treatment plant
with chlorination of the effluent | \$3,000,000 |

IV Recommendations for Water Development

It would seem logical that the City of Windsor, and as many of the adjoining municipalities as possible, should be supplied with water from a single water supply system.

Suitable sites for water intakes and treatment plants for domestic supply are limited to that part of the Detroit River upstream from the City of Windsor. This is due to the fact that the proposed sewage treatment plant to serve the

A number of tributary drainage courses receive pollution from industrial and sanitary waste outlets. A sample taken from McKee Creek at the Windsor refuse disposal area indicated some contamination.

Sampling Points	Mile- age	Location	B.O.D. (ppm.)	Solids(ppm)			Membrane Filter Coliform Count (M.P.N.)
				Total	Susp.	Diss.	
MC 0.5	0.5	McKee Cr. at city dump	4.2	10,774	352	10,422	220

The existing sewerage system for the City of Windsor is well summarized in the "City of Windsor Report on Sewage Disposal", 1954, by Gore & Storrie, Limited, Consulting Engineers. The report recommends the installation of primary treatment works to serve the city to be constructed in three parts. These parts with estimated costs are as follows:

- | | |
|---|-------------|
| (1) Relief interceptor sewers | \$8,640,000 |
| (2) Large interceptor sewer along
the river (30,000 feet) | \$5,500,000 |
| (3) Primary sewage treatment plant
with chlorination of the effluent | \$3,000,000 |

IV Recommendations for Water Development

It would seem logical that the City of Windsor, and as many of the adjoining municipalities as possible, should be supplied with water from a single water supply system.

Suitable sites for water intakes and treatment plants for domestic supply are limited to that part of the Detroit River upstream from the City of Windsor. This is due to the fact that the proposed sewage treatment plant to serve the

greater Windsor area will be located downstream from the city. The principle of primary treatment of the sewage has been accepted as the first stage, but with the ultimate objective of the International Joint Commission set as secondary treatment. The large flow of river water will be utilized to dilute the treated waste.

It is recommended that the city of Windsor continue to plan its treatment and distribution works to serve the city and the adjoining municipalities. There should be a continuous study by the Windsor Utilities Commission in co-operation with the individual municipalities to determine the best way in which these plans can meet the future water demands.

V Recommendations for Pollution Control

The need for pollution abatement in the Detroit River is urgent. A correction of this condition involves the construction of sewage works to serve the City of Windsor and adjacent areas. This can best be accomplished by a collector system to convey the sewage to one treatment site for the city and a minimum number for the entire area consistent with economics.

It is recommended that engineering studies be undertaken to complete the design and to estimate the cost of sewage works for the consideration of all participating municipalities.

WATER RESOURCES SURVEY

- COUNTY OF ESSEX -

CHAPTER 4

TOWNS

AMHERSTBURG

I Water Supply

1. Source

Water is supplied to the Town of Amherstburg from the filtration plant of Brunner Mond Canada, Limited. The intake is located in the Detroit River.

2. Pumpage

The average daily consumption of water in the town is 0.57 M.G.D. (U.S), and the maximum daily demand was 0.89 M.G.D. (U.S).

The Canadian Cannery's plant uses approximately six million gallons of water per month for a two month period each year.

3. Treatment

Water flows by gravity from the intake into the pump well which is equipped with travelling screens. Alum, activated carbon and ammonium sulphate treatment is employed to control turbidity, taste and odours. The chlorine treatment consists of pre and post chlorination.

The alum treatment is followed by mixing, coagulation, settling and filtration. The filters consist of four mechanical gravity type filters. A clear well provides 113,000 (U.S) gals. storage. The plant is rated at 2 M.G.D. (U.S.).

Standby power is provided by Brunner Mond Canada, Limited, during hydro failures.

4. Distribution

Water is supplied by direct pumpage to the municipality. The distribution system which has 1250 metered services consists of $9\frac{1}{4}$ miles of mains as follows:

$\frac{3}{4}$ miles of 4 inch diameter

6 " " 6 " "

1 mile " 8 " "

$1\frac{1}{2}$ miles " 12 " "

5. Potential Additional Supplies

An unlimited supply of surface water is available in the area from the Detroit River. The only limiting feature in the use of this water would be the pollution of the river by the upstream municipalities and industries.

II Water Requirements of the Future

The population has risen from 3,313 in 1948 to 4,377 in 1957. This represents a 32 per cent increase in the 10 year period. If this rate of increase were to continue over the next 20 years, 1.5 M.G.D. (U.S) would be needed to meet peak demands. Any increase in industrial water requirements would add to this estimated amount. Certain suburban parts of Anderdon and Malden Townships also are served from the Brunner Mond system, and the demand for water in the townships is increasing.

As mentioned above, the capacity of the Brunner Mond Canada, Limited filtration plant is 2 M.G.D. (U.S). The proportion of this capacity that would be available for the future needs of the town is not known. This should be expanded as required.

To adequately serve the water area for the next 20 years, elevated and ground storage reservoirs should be provided to meet peak demands on the system by Canadian Cannerys and domestic users.

III Water Pollution

Amherstburg is served by a sewer system that discharges for the most part untreated sanitary and industrial waste into the Detroit River. Some private residences are served by septic tanks which discharge directly into the sewer system.

The industries of Brunner Mond Canada, Limited, Calvert Distillers Limited, and Canadian Cannerys, Limited discharge untreated, or partially treated, wastes directly or through the municipal sewer system to the Detroit River. These industrial wastes require treatment. This can be accomplished either by individual treatment facilities provided by the industries or by municipal sewage works required to treat the sanitary flow from the municipality before discharging it into the river.

IV Recommendations for Water Development

If the estimated water requirements of Amherstburg by 1977 are taken as 1.5 M.G.D. (U.S), the delivery of this volume of water under present agreements will be contingent upon the capacity of the Brunner Mond filtration plant and the proportion of this capacity available for the use of the town. In view of this situation it is recommended that plans be made to ensure that the expanding water needs of the town will be taken care of in the future.

V Recommendations for Pollution Control

In keeping with the policy of pollution abatement to be carried out by all municipalities in the province, it is recommended that a sewage works programme be undertaken immediately by the Town of Amherstburg.

It is also recommended that industrial waste be included for treatment in the proposed municipal plant. Where this arrangement is not economical an individual treatment system will be necessary for the industry concerned.

ESSEX

I Water Supply

1. Source

(a) Wells

Essex did obtain its water supply from four deep wells, the locations of which are shown in Figure 4.

(1) The Garrow Well

There were originally four wells close together at the site of this well. However, in the early 1920's E. Wolfe redrilled one of the wells which is now the Garrow Well. It is 12 inches in diameter and was drilled into bedrock to a depth of 206 feet. The well will yield 85 g.p.m. with a pumping level of 150 feet. The water is obtained from the top few feet of the bedrock, the surface of which is at 119 feet.

The water is of better quality than that in the other three wells, although it is hard and contains some hydrogen sulphide.

(2) The Broom Well

This well was drilled in 1932 by R. Hendricks. It is a rock well and has a depth of 206 feet. It has an estimated pumping rate of 85-90 g.p.m. at a pumping level of approximately 120 feet.

The water is very hard and contains considerable hydrogen sulphide.

(3) The Michigan Central Railway Well

This well was drilled for the Michigan Central Railway prior to 1909, and the Town of Essex now has a lease on the well. It will yield approximately 125 g.p.m. at a pumping level of 120 feet.

This well and the Howe Well when operated simultaneously for any length of time, will lower the static levels in local wells.

The water is hard and contains hydrogen sulphide.

(4) The Howe Well

The Howe Well is 12 inches in diameter and was drilled in 1937 by International Water Supply, Limited. It was drilled into bedrock to a depth of 206 feet. In 1954 a pumping test showed the well to be capable of yielding 142 g.p.m. at a pumping level of 100 feet.

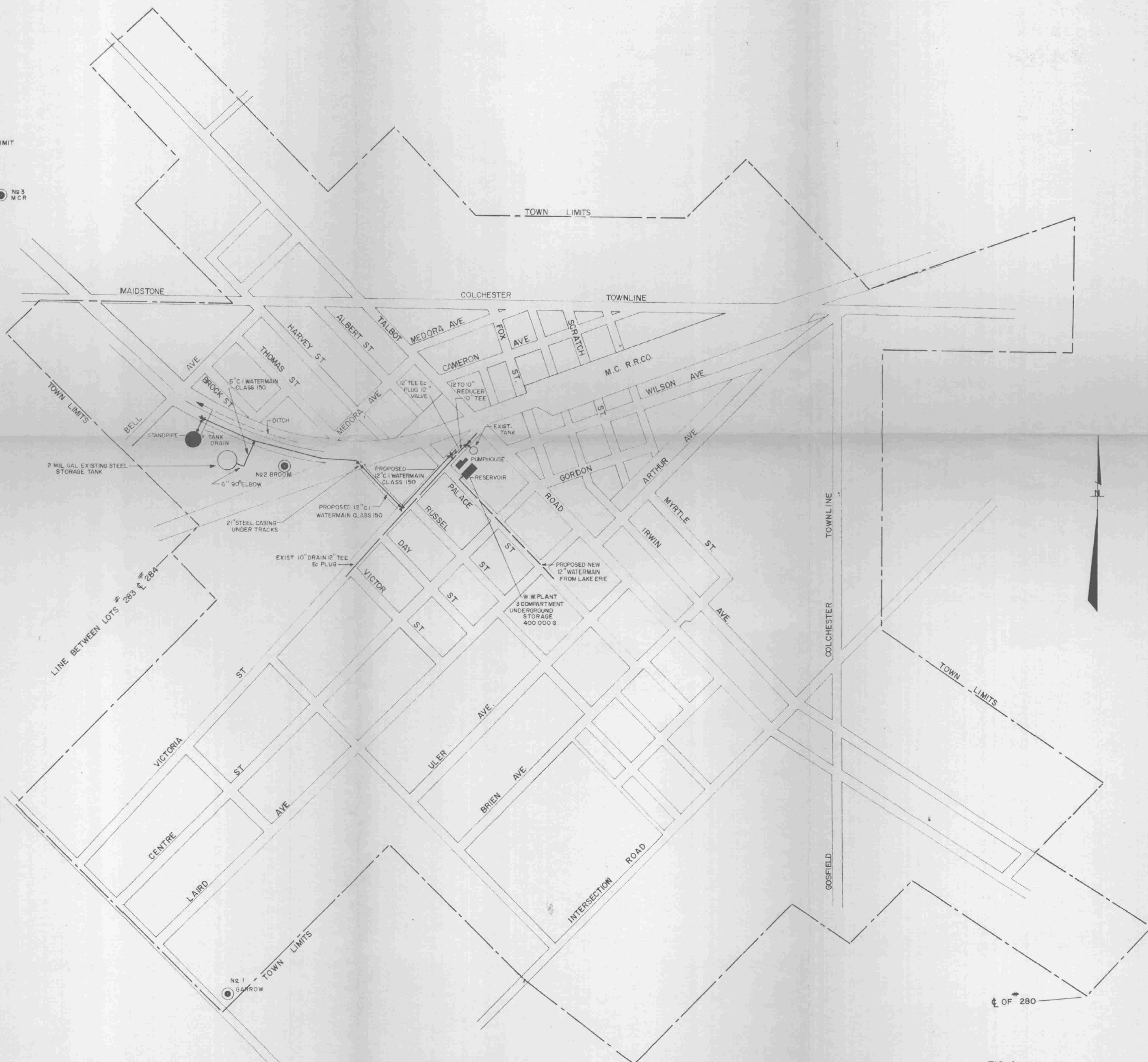
Continuous pumping of this well lowers the static levels in local farm wells. The well has been pumped dry during dry periods.

(b) Essex County Integrated Water System

The Town of Essex entered into an agreement with the OWRC to supply water from Lake Erie through the Essex County Integrated Water System. Chlorinated water was pumped

NO. 4
HOWE
1/2 M.I. FROM TOWN LIMIT

NO. 3
M.C.R.



OF 280

FIG. 4
TOWN OF ESSEX
WELL SUPPLY
SCALE: 1" = 500'

OWRC TORONTO JAN 1958 HE

through this pipe line into the town's system in August, 1958. The town wells continue to supply water to the system, but will be abandoned in 1959 when the integrated system will be completed.

2. Pumpage

Electrically driven Johnson vertical, turbine deep well pumps are used at all the wells except the Michigan Central Railway Well where a Pomona pump is used. These pumps have capacities ranging from 85 to 142 g.p.m. at pumping levels of 100 to 150 feet.

The Garrow, Howe, and Broom wells are normally pumped together for twenty-four hours a day. The Howe and Michigan Central Railway wells act in sympathy and when pumped for any length of time **will pull down** the local farmers' wells. In such cases the wells are shut off until they have fully recovered from the pumping.

The plant at the corner of Victoria and Alice Streets houses three electrically driven high lift pumps for pumping the water into the mains. Two of these pumps have capacities of 150 g.p.m. each with a head of 120 feet while the third has a capacity of 500 g.p.m. with a head of 150 feet. A fourth, 1000 g.p.m. gasoline driven pump is used for standby purposes.

The daily consumption of water varies between 250,000 and 300,000 gallons. During canning season this consumption doubles.

3. Treatment

Water from the wells is treated by means of aeration, filtration, and pre and post chlorination.

The water supplied through the pipe line will be fully treated on completion of the filtration plant in 1959.

4. Distribution

The distribution system consists of 12 miles of 10 to 4 inch cast iron pipes and $1\frac{1}{2}$ miles of $1\frac{1}{4}$ inch to 1 inch steel pipes. Only the industrial and commercial consumers are metered.

In the original system water was stored in a reservoir consisting of three connected compartments with a total capacity of 0.4 million gallons and in a circular steel tank with a capacity of 2 million gallons. An elevated storage reservoir was constructed by the OWRC in 1958.

5. Potential Additional Supplies

(a) Ground Water

Ground water supplies in the vicinity of the Town of Essex are limited in quantity and generally of unsatisfactory quality. Exploratory programmes for additional supplies of acceptable water have failed in the past to meet the needs of the town.

(b) Surface Water

Lake Erie provides the best source of surface water for this inland town. The only limitation on the amount of water available from this source would be the size of the project undertaken to develop the lake water supply.

II Water Requirements of the Future

The population of 3,464 in 1957 has doubled in the last 20 years and is expected to continue increasing steadily. Although the wells are capable of supplying sufficient water

to meet the daily average water consumption a shortage has occurred during each canning season.

If the population of the Town of Essex doubles by 1977, which would be a comparable rate of increase with the past 20 years, an amount of 700,000 g.p.d. would be needed for domestic and commercial consumption. Present canning factory demands amount to an additional 300,000 g.p.d. of water. By 1977 domestic and present industrial demand will require 1 M.G.D. Any increase in industrial demand above present peak requirements would have to be added to this amount.

III Water Pollution

The disposal of sewage in the Town of Essex is by individual septic tanks which employ the surface water sewer system for their outlets. Two main drainage courses carry the surface water and sanitary wastes in northerly and southerly directions from the town. The partially-treated wastes from the Stokely-Van Camp of Canada, Limited is discharged into the open south drain.

These drains are heavily polluted and have been offensive to the adjoining areas for years.

IV Recommendations for Water Development

In view of the inadequate supply of ground water in the vicinity of the Town of Essex, it is recommended that all future supplies of water be obtained from Lake Erie through the Essex County Integrated Water System.

V Recommendations for Pollution Control

The need for correction of pollution in the two drainage outlets in the Town of Essex is urgent. The correction of

these conditions involves two treatment processes, one to serve the municipality, and the other to serve the Stokely-Van Camp plant.

It is recommended that sewage works be provided to treat the sanitary flow from the Town of Essex. In addition, it is recommended that secondary treatment of industrial wastes from the Stokely-Van Camp of Canada, Limited be provided by means of spray irrigation.

HARROW

I Water Supply

1. Source

In 1958 a municipal water works system was built by the OWRC to serve the town and one industry. Water is obtained from Lake Erie near Colchester, a distance of $3\frac{1}{2}$ miles from the corporation.

The cannery operated by W. Clark, Limited obtains water from wells which is supplemented by water from the municipal system.

2. Pumpage

There are three pumps supplying lake water with capacities of 150 g.p.m., 350 g.p.m., and 1150 g.p.m. The average daily domestic consumption is 144,000 gallons.

The W. Clark canning factory uses an average of half a million g.p.d. Originally the water for canning purposes was obtained from two wells with a total yield of 750 g.p.m. Due to failure to maintain this rate of pumping, the wells are operated at approximately half their original capacity.

3. Treatment

A 30 inch diameter intake extends 1200 feet into Lake Erie ending in a depth of 18 feet of water. The treatment consists of micro-straining and chlorination.

The cannery well water is treated for iron removal and softening.

4. Distribution

The distribution system consists of:

20,000 feet of 12 inch cement-lined C.I. pipe

12,000 " " 10 " " " " "

9,000 " " 8 " " " " "

500 " " 6 " " " " "

20,000 " " 6 " Asbestos cement pipe

5,700 " " 4 " " " "

There are 45 hydrants. The system is not metered, except for industrial and commercial users. There are no reservoirs on the municipal system. The cannery has a ground reservoir with a capacity of 300,000 gallons and an elevated tank with a capacity of 7,775 gallons.

4. Potential Additional Supplies

(a) Ground Water

Ground water is available locally with aquifers in the overburden and bedrock. Some of the deeper wells encounter highly mineralized water which limits the areas in which good wells may be found. Some high capacity wells have been developed locally.

(b) Surface Water

An abundant supply of good quality water is available from Lake Erie.

II Water Requirements of the Future

The population of Harrow has shown an increase of 35 percent over the past 10 years. The population in 1957 was 1816. By 1980, with a similar rate of increase, the estimated population of Harrow would be approximately 3300 which would require 330,000 g.p.d. exclusive of industrial needs.

This rate of increase in population was based on a period when private wells served the people of Harrow. It is likely that consumption of water will increase as a result of the availability of an assured supply from Lake Erie.

III Water Pollution

Septic tanks and field tile systems are employed for sewage disposal in the town. Sewage is discharged from private dwellings and commercial establishments into surface water drains which lead into the Richmond Drain. This results in pollution of the drainage course.

The W. Clark, Limited canning factory discharges a large volume of partially treated waste into the Richmond Drain. This creates a very undesirable condition in the vicinity of Harrow which has given rise to numerous complaints. A recent analysis of the waste discharged to the drain indicated a 5 day B.O.D. of 212 p.p.m. and suspended solids of 94 p.p.m.

IV Recommendations for Water Development

As the water needs of the Town of Harrow increase, it is recommended that the supply continue to be obtained from Lake Erie through the recently constructed water works system.

V Recommendations for Pollution Control

The soil conditions in the area are not suitable for individual septic tank systems. This situation will be aggravated with the increase in water consumption resulting from the new water works system.

It is recommended that a municipal sewage works programme be initiated to eliminate pollution, and to provide modern facilities.

Improvements in the waste treatment process by the spray irrigation method which have been undertaken by the W. Clark, Limited this year will take a year or two to be completely effective. This should remove industrial waste pollution from the Richmond Drain. It is recommended that the entire canning waste be treated by the spray irrigation method for disposal on the land.

KINGSVILLE

I Water Supply

1. Source

Water is obtained from Lake Erie at a point west of the Kingsville harbour.

2. Eumpage

The average daily water consumption is 325,000 gallons. The maximum daily consumption is 540,000 gallons. The supply from the filtration plant is metered.

3. Treatment

A 16 inch diameter steel pipe extends 3210 feet into Lake Erie and terminates in a depth of 32 feet of water. The

intake crib consists of a steel boiler on end with a 4 foot opening on top protected by a steel plate which is raised on legs 6 to 8 inches above the opening.

The intake discharges water by gravity into settling basins with a total capacity of 84,000 gallons. This provides one hour and twenty minutes settling time for the designed flow of 1.5 M.G.D. Prior to entering the settling chamber, the water is treated with alum followed by a baffle arrangement which provides mixing.

Pumps discharge water directly to the town through three pressure filters each of which has a capacity of 0.5 M.G.D. Prechlorination is applied to the pump suctions before filtration.

4. Distribution

The distribution system consists of the following mains:

2.42	miles	of	8	inch	diameter	C.I.	pipe
1.67	"	"	6	"	"	"	"
4.92	"	"	4	"	"	"	"

A 30,000 gallon standpipe maintains pressure on the distribution system. There are 980 domestic, 45 commercial, and 10 industrial services.

5. Potential Additional Supplies

An unlimited supply of water is available from Lake Erie.

II Water Requirements of the Future

The population of Kingsville in 1957 was 2988 which was a 20 per cent increase over the previous 10 year period.

Assuming a similar rate of increase the population in 1980 will be approximately 4500. A proportionate increase in water consumption will require in excess of 800,000 g.p.d. by 1980. This amount includes normal industrial requirements which have been increased in the same proportion.

A request has been made by industry for an additional 500 g.p.m. of water which could increase substantially the above estimate of water requirements by 1980.

III Water Pollution

At present there is no sewage treatment plant in Kingsville. All domestic sewage is treated by septic tanks which have no weeping tiles due to the heavy soil conditions and therefore discharge to the combined storm and sanitary system. This sewer system has seven outlets to Mill Creek which empties into Lake Erie. The sewer outfall to Mill Creek at Lakeside Park is chlorinated.

Industrial wastes are discharged to the town sewers by Canadian Cannery and Stewart Fisheries, Limited. Some treatment of these wastes is provided by screening and settling.

There have been numerous complaints of pollution in the Creek and Lake. The following analyses of samples obtained during the survey confirm these conditions:

Sampling Points	Mileage	Location	B.O.D. (p.p.m.)	Solids (ppm)			Membrane Filter Coliform Count (M.P.N.)
				Total	Susp.	Diss.	
ML 0.2	0.2	Mill Cr. at Lakeview Pk. Kingsville	89.0	480	50	430	146
ML 1.5	1.5	Mill Cr. above town	2.2	436	16	420	8

Indicated Number, per 100 ml in each case

IV Recommendations for Water Development

The future water needs of Kingsville will logically be met by an expansion of the water works system supplied from Lake Erie. In order to meet this expansion consideration should be given to the provision of a modern, mechanical gravity filtration plant and sufficient reservoir capacity to meet peak water demand. It is recommended that an engineering report be prepared on the Kingsville water works to plan for the future water needs of the municipality.

V Recommendations for Pollution Control

It is recommended that a sewage works program be initiated to control the discharge of waste in the Kingsville area. Such a program should include provision for the treatment of industrial wastes from the canning factory and fishery plant which presently utilize the town's sewer system. A decision will have to be made on whether these wastes will be treated in the municipal system or be treated by each industry. Suburban sections of Gosfield South Township, now part of Sandwich West Township, should be included in a sewage works programme.

LA SALLE

I Water Supply

1. Source

Water is supplied from the Detroit River through the Windsor water works system.

2. Pumpage

The water is received under pressure from the Windsor Utilities Commission. No further pumping is required. The average daily pumpages during the years 1938 and 1957 were 78,600 gallons and 98,610 gallons, respectively. This represented an increase of 25 per cent in a 20 year period. The per capita daily consumption in the same period decreased from 97 gallons to 35 gallons. This decrease is attributed to leak correction measures and installation of meters.

3. Treatment

The water received by La Salle is treated by the Windsor Utilities Commission.

4. Distribution

There are approximately 600 services in the distribution system. All of these except 20 are metered. The distribution system consists of approximately 14 miles of C.I. pipe varying in size from 4 to 14 inches.

A low pressure condition exists in the south end of the distribution system in the vicinity of the Essex Golf Club. The Golf Club is interested in improving the water pressure to the extent of installation a separate system which would use either Turkey Creek or the Detroit River as its source.

5. Potential Additional Supplies

It is anticipated that additional water may be obtained from Windsor as the water needs of the community increase.

II Water Requirements of the Future

The population of La Salle has almost doubled in the

past 10 years. The population in 1957 was 2830. By 1980 the expected population will be about 6000 based on the above rate of increase. The estimated water requirements will be approximately 360,000 g.p.d. assuming a per capita daily consumption of 60 gallons.

III Water Pollution

Sewage disposal is carried out by individual septic tank and field tile disposal systems. Heavy soil and high water table conditions interfere with the efficient operation of the septic tank and tile beds. Sanitary surveys of the area have indicated that many of the systems discharge to road ditches. In addition to the adverse natural conditions, the specifications and inspections of installations of private sewage systems have not been adequate.

The above conditions have resulted in much sanitary waste entering the road ditches and municipal surface water drains. These discharge either to Turkey Creek or directly to the Detroit River. This has led to many complaints of pollution. Analyses of water samples obtained from Turkey Creek and a visual examination at the time of this survey confirm the general unsanitary conditions in the water courses in the area.

IV Recommendations for Water Development

An adequate amount of good quality water is available through the Windsor water works system. Any problems related to the distribution of water in La Salle can be overcome by improving the distribution system. It is recommended that the future supply of water continue to be obtained through the Windsor system.

V Recommendations for Pollution Control

It is recommended that a sewage works programme be undertaken to eliminate undesirable pollution conditions resulting from the discharge of sanitary wastes.

LEAMINGTON

I Water Supply

1. Source

The Town of Leamington has obtained water from two deep wells located close together in the northwest section of the town.

The No.1 well is 12 inches in diameter. Water is obtained from sand and gravel above the bedrock. The well originally flowed, but since 1923 the static level has fallen slowly. In 1957 it was approximately 12 feet from the ground surface.

The second municipal well was drilled to a depth of 112 feet in 1937 at a distance of fifty feet from the No.1 well. The aquifer is a seventy foot thick layer of sand, gravel, and boulders which overlie the bedrock under a capping of forty feet of clay. In 1949 International Water Supply, Limited tested this well with the newly installed 2 M.G.D. pump. Water was pumped at an average of 1350 g.p.m. for 14 days drawing the water down from 12 feet to 49 feet and from 12 feet to 41 feet in the No.1 well which had been shut off for the duration of the test.

The H.J. Heinz Company of Canada, Limited has a drilled well which has been used during the summer months by the company. It is a 4 inch diameter well which was

drilled in 1935 to a depth of 76 feet. The aquifer is a twenty-five foot layer of gravel.

The Essex County Union Water System supplies the H.J. Heinz Company of Canada, Limited with chlorinated water.

2. Pumpage

A 2 M.G.D. capacity pump is used at the No.2 well and a 1 M.G.D. pump at the No.1 well. Both are electrically driven by 25 and 5 horsepower motors respectively and discharge water into reservoirs. The high-lift pumps at the Clark Street West pumping station have a capacity of 2 M.G.D. A 1 M.G.D. gasoline driven pump is used for standby purposes.

The Heinz water system is supplied from Lake Erie, a well, the Town of Leamington, and the Essex County Union Water System. The Lake Erie supply has a capacity of 7.2 M.G.D. The well can supply an additional 144,000 g.p.d. In 1957 a large proportion of the 3 M.G.D. capacity of the OWRC pipeline supply was also used by the company. The water from these sources is used for process purposes. The domestic water is supplied through the town water system.

3. Treatment

Water from the town wells receives aeration and settling treatment for iron removal.

The Heinz lake supply receives chlorination prior to being pumped to the factory. A small quantity of this water is filtered through pressure filters with additional chemical treatment of alum and activated carbon.

4. Distribution

Four underground reservoirs with a total capacity of 1,182,300 gallons are located at the pumping station.

The distribution system includes 24 miles of 4 to 12 inch diameter C.I. mains and 3.75 miles of 6 to 12 inch diameter asbestos-cement pipe. There are 2940 domestic, 267 commercial and 4 industrial services. The commercial and industrial services are metered. Improvements in the distribution system will soon be required to meet the growing number of services.

The Heinz Company has a 16 inch line leading from the lake to an elevated tank with a total capacity of 150,000 gallons. However, the 16 inch line limits the flow of water when the pumps are operating at capacity.

The OWRC pipeline built to supply the town and the Heinz plant consists of 23,700 feet of 30 inch diameter reinforced concrete pipe and 21,000 feet of 12 inch diameter C.I. pipe.

5. Potential Additional Supplies

The quantity of good quality water that is required by the town and the H.J. Heinz Company of Canada, Limited, can only be supplied economically by water from Lake Erie. The Essex County Union Water System has been designed to meet these future needs.

II Water Requirements of the Future

The population in 1957 was 8316 which was an increase of almost 40 per cent over the previous 27 year period. Considering annexation plans and assuming a similar rate of population increase, there will be an estimated 50 per cent increase in population in the next 20 years which would require in excess of 2 M.G.D. The OWRC has agreed to supply the Heinz Company

with water up to 10 M.G.D. which would make a total of at least 12 M.G.D. required by the end of the 20 year period if there were no increase in industrial demand.

III Water Pollution

The Town of Leamington is served by combined sanitary and storm sewers. The outfall for this sewer system is the Selkirk Drain, part of which is covered to the lake and part is an open ditch.

Heavy pollution exists in Lake Erie in the harbour area, particularly at the Selkirk Drain outfall. Local canning factories contribute to this pollution throughout the year, but it is intensified during the tomato canning season.

Samples taken in drains emptying into Lake Erie in the Leamington area are as follows:

Sampling Points	Mile- age	Location	B.O.D. (p.p.m.)	Solids (p.p.m.) Total Susp. Diss.			Membrane Filter Coliform Count per 100 M.L. (M.P.N.)
ST 1.9	1.9	Sturgeon Cr. 2 miles east of Leamington	6.4	554	46	508	64
ED 4.0		Selkirk Drain at Bridge Lake Erie	39.0	536	100	436	Less than 2
ED 5.0		Stream at Bridge on Hwy #18, 1½ mi. west of Leamington	20.0	944	136	808	9100

Action is being taken by the municipality to correct these pollution conditions by a programme of sewage works construction. The first stage of this programme is the construc-

tion of a trunk sewer to the site of the proposed sewage treatment plant. The town has authorized the OWRC to retain consulting engineers to prepare plans and specifications and to call for tenders on a primary sewage disposal plant.

IV Recommendations for Water Development

It is recommended that future water needs of the Town of Leamington be met with water supplied by the Essex County Union Water System.

V Recommendations for Pollution Control

Immediate steps should be taken by the municipality to eliminate the discharge of untreated sanitary wastes and partially treated industrial wastes to the lake. It is therefore recommended that sewage treatment works be constructed to eliminate the pollution of Lake Erie in the vicinity of the Town of Leamington.

OJIBWAY

I Water Supply

The Town of Ojibway is designated a mining municipality. The sole industry is the Canadian Rock Salt Co. Limited which owns the land area within the town. There is no residential development.

Domestic water is supplied by the Township of Sandwich West. The company obtains its own process and fire protection water directly from the Detroit River.

II Water Requirements of the Future

The Canadian Rock Salt Co. Limited is interested primarily in the subsurface mining rights of the area. A

company has been formed, known as the Ojibway Development, Limited for the purpose of developing and selling 1800 acres of the town for industrial sites.

At present no industries have made commitments for locating in this area. However, it is likely that domestic water for future development will be obtained from Sandwich West Township and process water from the Detroit River.

RIVERSIDE

I Water Supply

1. Source

The Town of Riverside receives its water supply at present from the City of Windsor and the Town of Tecumseh. A new filtration plant to serve the towns of Riverside and Tecumseh is under construction with an intake in the Detroit River at Lake St. Clair.

2. Pumpage

The total water consumption in 1957 amounted to 266,344,000 gallons with a daily average of 729,000 gallons. The following table indicates the amount of water obtained from each system:

<u>Municipality</u>	<u>Total Consumption (gals)</u>	<u>Average Daily Consumption (gals)</u>	<u>Percentage of Total Consumption</u>
Tecumseh	17,170,000	47,000	7
Windsor	249,174,000	682,000	93

3. Treatment

The water supplied to the Town of Riverside receives its treatment in the systems of Tecumseh and Windsor.

4. Distribution

The distribution system consists of 31.5 miles of water mains ranging in size from 4 to 12 inches in diameter. The system is metered with 4181 domestic, 204 commercial and 24 industrial services, respectively. There is no storage reservoir in the present system.

5. Potential Additional Supply

An ample supply of water is available from the Detroit River which borders the municipality.

II Water Requirements of the Future

The population of Riverside in 1957 was 14,798, an increase of 115 per cent over the previous ten years.

The new filtration plant with a designed capacity of 4 M.G.D. and an ultimate capacity of 16 M.G.D. with the construction of additional filters, should meet the water needs of this municipality for some years.

III Water Pollution

The Town of Riverside is served by separate storm and sanitary sewers. The sanitary flow receives treatment at an activated sludge sewage treatment plant with the effluent being discharged to Little River.

Analyses of samples taken during the course of this survey indicate that the plant is providing little or no treatment. The results of the analyses are listed as follows:

<u>June 18, 1958</u>	<u>B.O.D. (ppm)</u>	<u>Solids (p.p.m.)</u>		
		<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>
Influent	104	508	34	474
Effluent	131	588	100	488
<u>December 3, 1958</u>				
Influent	55	564	82	482
Effluent	40	568	82	486

The resulting pollution of the Little River has given rise to complaints from residents along the banks and Lake St. Clair at its mouth.

IV Recommendations for Water Development

It is recommended that the future water requirements for the Town of Riverside be developed as needed from the Detroit River.

V Recommendations for Pollution Control

It is not economically feasible to renovate the existing sewage treatment plant.

It is recommended that the existing plant be abandoned and a **new** sewage treatment plant constructed to correct pollution conditions in Little River and Lake St. Clair in the vicinity of Riverside.

A report on sewage works has been prepared by the town's consulting engineers and a new site selected.

TECUMSEH

I Water Supply

1. Source

The Town of Tecumseh obtains its water supply from

Detroit River at Lake St. Clair. A 16 inch diameter intake, 175 feet in length, terminates in 14 feet of water.

2. Pumpage

The rated capacity of the filter plant which is limited by the capacity of the pressure filters is 1.7 M.G.D. In 1957 a total of 128 million gallons was consumed. This includes water distributed to a number of adjoining municipalities which are listed in the following table of water consumptions for 1957:

<u>Municipality</u>	<u>Total Consumption (gals)</u>	<u>Average Daily Consumption (gals)</u>	<u>Percentage of Total Consumption</u>
Tecumseh	86,811,000	236,000	68
St.Clair Beach	18,652,000	51,000	14
Twp of Sandwich W.	5,137,000	14,000	4
Riverside	17,170,000	47,000	14

3. Treatment

The existing pressure-filter plant is completely outdated and is not providing adequate treatment of the water. It consists of token alum treatment with only three minutes retention. As a result of the limited mixing, coagulation and settling period some alum passes through the filters to form a floc in the distribution system. Activated silica is also used during periods of high turbidity in the raw water. Chlorine gas is applied to the water before filtration.

Water is pumped directly into the distribution system without provision for clear water storage.

This plant will be replaced by a modern 4 M.G.D. filtration plant which will be built on Lake St.Clair to serve jointly the municipalities of Riverside and Tecumseh.

4. Distribution

The Town of Tecumseh distributes water to the Village of St.Clair Beach, Sandwich East Township and the Town of Riverside. The distribution system consists of 39 miles of mains as follows:

Tecumseh	-	26	miles	of	6	to	10"	diameter	C.I.
St. Clair Beach	-	5	"	"	"	"	"	"	"
Sandwich East Twp.	-	2	"	"	"	"	"	"	"
Riverside	-	6	"	"	"	"	"	"	"

During the winter adequate pressures can be maintained in the distribution system, but in the summer low pressure areas occur in some sections.

The system is metered and supplies 1262 domestic services in Tecumseh, 372 domestic services in St.Clair Beach, 322 domestic services in Riverside, and 115 domestic services in Sandwich East Township.

5. Potential Additional Supplies

Adequate supplies of water may be obtained as required from the Detroit River at Lake St.Clair.

II Water Requirements of the Future

The population of Tecumseh has increased from 3343 in 1948 to 4212 in 1957. This represents an increase of 26 per cent in that 10 year period. The maximum daily water consumption of the systems of Riverside and Tecumseh is 3 M.G.D.

The 4 M.G.D. filter plant to be constructed to serve the water systems of Riverside and Tecumseh will have sufficient capacity to meet the needs of the municipalities for the next five years. The plant has been designed to have ultimate capacity of 16 M.G.D. by the addition of filters as required.

III Water Pollution

The town is served by private septic tank disposal systems. A storm sewer system in the town carried some sanitary and industrial wastes which contaminate Lake St. Clair at the outfalls.

The Green Giant of Canada, Limited has developed a spray irrigation system of waste treatment which has eliminated a source of heavy pollution in the storm sewer system.

IV Recommendations for Water Development

Plans have been completed to take care of the future water needs of this municipality by a modern filtration plant with an intake in the Detroit River.

V Recommendations for Pollution Control

The correction of pollution conditions in Lake St. Clair is required to assure good quality water in that part of Lake St. Clair adjacent to the intakes of two major water systems. It is therefore recommended that a sewage works programme be undertaken by the Town of Tecumseh to eliminate the discharge of sewage into Lake St. Clair.

WATER RESOURCES SURVEY

- COUNTY OF ESSEX -

CHAPTER 5

- VILLAGES -

BELLE RIVER

I Water Supply

1. Source

Water is obtained from Lake St. Clair through a 16 inch diameter intake 1850 feet in length which terminates in seven feet of water.

2. Pumpage

The average daily consumption of water is approximately 475,000 gallons. This amount varies from a winter average of 350,000 g.p.d. to a summer average of 1,000,000 g.p.d. The maximum daily consumption in 1957 was 1,175,000 gallons.

3. Treatment

The treatment of water serving the Village of Belle River is accomplished with a modern filtration plant. Treatment consists of the addition of alum followed by coagulation and settling, filtration by means of three gravity filters employing anthrafilt as the filter medium and pre and post chlorination.

4. Distribution

The distribution system consists of $3\frac{1}{2}$ miles of 6 to 8 inch diameter pipe in the Village of Belle River. Water is also supplied to the townships of Maidstone and Rochester where there are 10 miles and 2 miles respectively of 6 to 8 inch pipe.

The filtration plant is metered. The 1700 services which include 584 in Belle River and 1116 in the townships are charged a flat rate.

A clear water reservoir provides 135,000 gallon storage at the filtration plant. In addition there is a 250,000 gallon elevated tank.

5. Potential Additional Supplies

A plentiful supply of water is available from Lake St. Clair to meet future requirements.

II Water Requirements of the Future

The population of Belle River has risen from 1250 in 1948 to 1864 in 1957 which is an increase of 50 percent in ten years.

The present system can serve the Village of Belle River for the next 15 or 20 years.

Consideration is being given to a major feeder main extension to serve additional areas in the Township of Maidstone which will ultimately require an increase in the capacity of the present filter-plant intake.

III Water Pollution

Belle River is served by a storm sewer system with outlets into the Belle River. Private septic tank and field tile disposal systems are employed for sewage disposal. Some sanitary and industrial wastes are discharged into the Belle River through the sewer system. Samples collected at the time of the survey indicated that there was pollution in the river in the vicinity of the village.

The analyses of the river samples are as follows:

Sampling Points	Mile-age	Location	B.O.D. (p.p.m.)	Solids (p.p.m.)			Membrane Filter Coliform Count per 100M.L. (M.P.N.)
				Total	Susp.	Diss.	
B 0.0	0.0	Belle River below village at Rwy. Bridge.	3.8	542	64	478	Less than 2
B 1.5	1.5	Belle River above Village	16.0	568	92	476	Less than 2
B 5.0	5.0	Belle River at Hwy. No.401 Bridge	5.4	838	128	710	232

The main source of industrial pollution in the area is from the Belle River Canning Factory. The waste receives primary treatment in the form of screening and the liquid portion is discharged to the municipal sewers. The volume of this waste is estimated at 100,000 g.p.d.

The following are analyses of samples obtained from the plant effluent before being discharged into the sewer system.

	B.O.D. (p. p.m.)	Solids (p.p.m.)		
		Total	Susp.	Diss.
Effluent	21,500	18,170	9,748	8,422

IV Recommendations for Water Development

It is recommended that future requirements for water be met through the development of the existing water-works system.

V Recommendations for Pollution Control

The correction of pollution conditions in the Belle River will require the construction of sewage works. The treatment of domestic sewage and industrial waste should serve the

village and the Belle River Canning Factory. In the event that it is not economical to treat the industrial wastes in a municipal sewage treatment plant, secondary treatment should be provided by the Canning Factory.

It is therefore recommended that a sewage-works programme be undertaken to eliminate pollution conditions existing in the vicinity of the Village of Belle River.

ST. CLAIR BEACH

I Water Supply

1. Source

Water is supplied through the Tecumseh water-works system.

2. Pumpage

The average daily consumption in 1957 was 51,000 gallons. The total consumption for the year was 18,652,000 gallons.

3. Treatment

The water supplied to the municipality is treated at the Tecumseh filtration plant.

4. Distribution

The distribution system consists of 5 miles of 6 to 10 inch diameter C.I. mains. The system is metered with 355 domestic services.

5. Potential Additional Supplies

Adequate supplies of water will be available from the proposed Riverside-Tecumseh filtration plant and its distribution system.

II Water Requirements of the Future

The Village of St. Clair Beach had a population of 1020 in 1957 which was an increase of 698 over the previous ten years. Provision has been made to meet the future needs of this municipality in the design of the Riverside-Tecumseh filtration plant.

III Water Pollution

Septic tank and field tile disposal systems are employed for sewage treatment in the Village of St. Clair Beach. Some pollution conditions have been reported in Lake St. Clair near the mouth of Pike Creek and in the creek itself. Results of analyses of samples obtained in Pike Creek are as follows:

Sampling Points	Mile-age	Location	B.O.D. (p.p.m.)	Solids (p.p.m.)			Membrane Filter Coliform Count per 100 M.L. (M.P.N.)
				Total	Susp.	Diss.	
P 3.6	3.6	Pike Creek at Hwy. No.39.	11	1042	158	884	Less than 100
P 0.0	0.0	Pike Creek at the Junction with Lake St.Clair.	6.4	494	100	394	Less than 100

The F. R. Bear Corporation canning factory located in the village has created pollution problems in some of the municipal drainage courses.

IV Recommendations for Water Development

It is recommended that the supply of water to serve the Village of St. Clair Beach be obtained through the Tecumseh water system.

V Recommendations for Pollution Control

 In the event that an area sewage works scheme be undertaken it should include the treatment of domestic and industrial wastes from this municipality. In the meantime it is recommended that close supervision of private disposal systems be maintained by village officials to control pollution in Pike Creek and Lake St. Clair.

WATER RESOURCES SURVEY

-COUNTY OF ESSEX-

CHAPTER 6

-TOWNSHIPS-

I

Water Supply

Most of the rural areas in the county are served by water from individual wells. However, the municipalities bordering Lake St. Clair, Detroit River and Lake Erie have developed to some degree water systems in which surface waters are utilized. To an increasing extent the inland parts of the county are being served by water supplied through the Essex County Union Water System and extensions of other water systems.

Wells obtain water from both the bedrock formations and the overburden. Highly mineralized water occurs in a large proportion of the bedrock wells. Although wells which have been developed in sand and gravel aquifers in the overburden are mostly fresh they often contain iron to an objectionable degree.

The better drilled wells are located in the southern parts of the county where sand and gravel occur in favourable thickness in places above or interlayered in the drift. Most of the drilled wells obtain water from domestic and live-stock purposes from the upper few feet of the bedrock. In certain areas in the northern townships dry holes and highly mineralized water have created acute water supply problems. This has resulted in the use of mineralized water for stock purposes with domestic supplies obtained from dug wells and, in some instances, from rain water.

Some water supplies occurring in built-up areas in the townships are discussed separately below, along with the Essex County Union Water System.

CEDARHURST PARK AND CEDAR ISLAND

This community is made up mainly of summer residents. The water supply is from shallow wells. The small-sized lots which contain both the well and septic-tank system contribute to a well pollution problem. Consideration should be given to supplying these, and similar areas, with water from a central supply system, either from the Harrow or Union systems or from a new system.

COMBER

The Police Village of Comber obtains its water from a drilled well 131 feet deep. The high chloride content of the water makes it undesirable for drinking purposes. Water is pumped from the well into a 62,462 gallon reservoir. A high lift pump with a capacity of 100 U.S. g.p.m. maintains pressure on the system. The peak pumpage was reported to have been 42,000 U.S. g.p.d. Some treatment is provided to the water by aeration and settling.

The 1957 population was 575 which has remained fairly constant over the past few years. The present system is adequate to serve this community.

McGREGOR

The hamlet of McGregor obtains its water from private wells. Mineral water is present in the area limiting the amount of good quality ground water supplies available for a municipal system.

The population of the community and adjacent built-up area is approximately 400. Based on 100 g.p.d. per capita if a well or wells were used as a source of water supply, a yield of at least 30 g.p.m. would be required. If the local canning factory were to be supplied with water from the proposed system it would be necessary to develop a much larger source of supply.

STONEY POINT

The Police Village of Stoney Point is supplied with water from Lake St. Clair through a 12 inch diameter intake which extends 800 feet into the lake and terminates in two feet of water.

The average daily consumption of water in the village is 33,600 gallons with a maximum daily consumption of 89,000 gallons. The water receives alum treatment, filtration by three pressure filters and post chlorination. The distribution system consists of seven miles of 6 inch diameter cast iron mains.

Stoney Point has a population of 329 which increases during the summer months to a little more than 1,000. The system was enlarged in 1958 by the addition of a third filter and a pump to meet the peak water demands during the summer period.

SANDWICH EAST

The present source of water supply for the Township of Sandwich East is the Windsor Utilities Commission and the Tecumseh Public Utilities Commission. Treated water is received under pressure from these systems.

The average daily water consumption in the 10 year period from 1948 to 1957 has increased from 157,145 gallons to 848,655 gallons representing an increase of 440 percent. The per capita daily consumption during this period has increased from 36 gallons to 43 gallons. In view of the small change in the per capita water consumption this increase can be attributed to population growth.

There are approximately 5,600 services supplied through 40 miles of 4 to 12 inch diameter C.I. mains. About 90 percent of the township is served with municipal water. The Windsor Utilities Commission supplies 95 percent of the water. Low pressure areas occur in the extreme south and west end of the distribution system due to a large number of small-diameter mains.

Consideration has been given to alternative sources of supply. This has arisen because of the rates charged for water supplied by the Windsor Utilities Commission. In 1957 the township drilled a well which was estimated to yield 100 g.p.m. There is some doubt as to the suitability of this well due to the presence of hydrogen sulphide in the water.

Several schemes have been proposed to obtain Detroit River water to supply the township alone or conjointly with other municipalities. The wisdom of an additional filtration plant in this area is questionable, but it would seem advisable that any such plant should have its intake upstream from the City of Windsor.

The population in 1957 was 20,768 which represented a 62 percent increase over the previous ten year period. Based on this rate of increase it is estimated that the population by 1966 would be 34,000 with an average daily water consumption of 3.5 million gallons. The amount of water supplied to the township has been adequate; however, a large number of small diameter mains in the distribution system makes future expansion difficult. In anticipation of rapid development of the township areas, plans should be prepared for the systematic installation of large diameter feeder mains.

SANDWICH WEST

Treated water is supplied to the Township of Sandwich West by the Windsor Utilities Commission. In 1957 the average daily water consumption in the township was 1,179,830 gallons, compared with 207,737 gallons in 1938. Although this indicates a 470 percent increase in 20 years the per capita daily consumption decreased from 71 to 66 gallons in the same period.

The distribution system consists of 72 miles of mostly cast iron mains varying in diameter from 6 to 24 inches.

Approximately 80 percent of the population is served from the municipal system. Consideration is being given by the township to the construction of a water filtration plant with an intake in the Detroit River at Ojibway. The location of an intake in this section will increase treatment problems because of pollution in the river.

In 1957 the population in the township was 20,747 an increase of 184 percent over the previous ten years. An estimate of water consumption in the township in 1966 based on this rate of increase and the present per capita daily consumption would be 3.9 M.G.D. Any rapid increase in industrial expansion in the area may substantially add to these water requirements.

ESSEX COUNTY UNION WATER SYSTEM

The first stage of an integrated water supply system serving the towns of Leamington and Essex and areas in the townships, of Mersea, Gosfield North, Gosfield South, Maidstone and Sandwich South was put in operation in August, 1958. The intake for the system is located in Lake Erie at Union, 3.5 miles west of Leamington. It consists of a 42 inch diameter pipe which extends 1,500 feet into the lake terminating in 18 feet of water. Treatment of water in the first stage consists of chlorination. The second stage of this system will provide for a modern filtration plant which will be equipped with micro-straining units for algae control.

The present plant capacity is 3 M.G.D. In 1959 when the treatment plant is completed the capacity will be 8 M.G.D.

The ultimate designed capacity with future extension is 32 M.G.D. Water storage is provided in the system by a 250,000 gallon elevated tank in the Town of Essex and a 333,000 gallon elevated tank in Leamington.

The distribution system is shown on the accompanying Figure 5 and consists of the following:

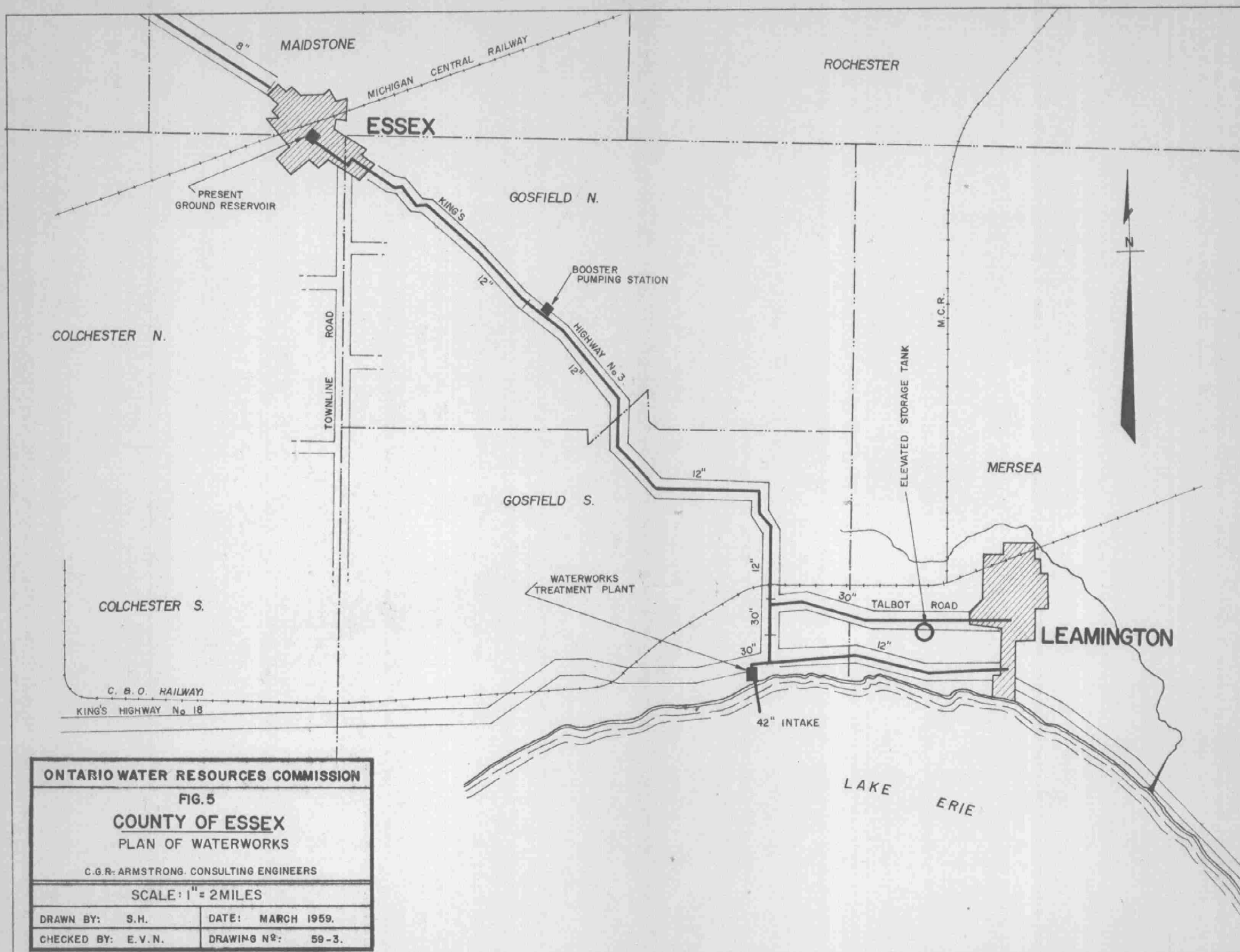
To Leamington	-	23,700 feet of 30 inch diameter reinforced concrete pipe; 21,000 feet of 12 inch diameter C.I. pipe
To Essex	-	59,000 feet of 12 inch diameter C.I. pipe
		29,000 " " " " " asbestos pipe
		12,000 " " 8 " " " "
		10,000 " " 8 " " " "

II Water Pollution

The rural areas in the county are served by septic tank and field tile systems. Septic tanks are also used for disposal of sanitary wastes in a number of built-up areas within the townships. In addition these more populated areas are served by storm, sanitary or combined sewers. Most of the sanitary flow in these sewer systems is discharged untreated to the receiving streams and lakes. This has resulted in pollution of the natural water courses of the county.

In this county there are a number of rural canning factories which have waste treatment problems. Most of these are contributing heavily to pollution conditions during the canning period.

Some pollution conditions existing in the built-up areas in the townships are discussed separately below.



TOWNSHIP OF ANDERDON

Edgewater Beach

An investigation of pollution conditions in the areas of Texas Road and Seacrest Drive has indicated that private septic disposal systems operate inadequately. Samples from storm sewers and ditches have shown coliform counts in excess of 1 million. Improper construction of septic tank systems and poor soil conditions have contributed to this condition.

The most effective means of eliminating existing pollution in the area would be to provide sanitary sewers and connect them to the Amherstburg sewage system or to a small local sewage treatment plant. As a temporary measure the septic tank effluents might be discharged to a chlorine contact chamber for treatment. The installation of all private septic tank systems should be inspected and made to conform to a recognized standard.

McGregor

Most of the residents of this hamlet employ septic tank sewage disposal systems. Many of these systems overflow to local storm sewers which discharge into the Canard River. The extent of this pollution on the river is shown by the following analyses:

Location	B.O.D. (p.p.m.)	Solids (p.p.m.)			Coliforms Indicated Number per 100 M.L.
		Total	Susp.	Diss.	
Sewer out- fall to Canard River	14	510	60	450	100,000
"	53	2612	86	2526	100,000
"	121	1292	178	1114	10,000,000

Canard River above sewer outfalls	1.3	236	18	218	1,000
Canard River below sewer outfalls	300	2162	228	1934	100,000

The treatment of sewage by means of a sewage
loag on is perhaps the most economical method of sewage treatment
for this small community.

TOWNSHIP OF GOSFIELD SOUTH

Cedarhurst Park and Cedar Island

Septic tank sewage disposal systems operate in-
adequately on the small-sized lots which predominate in these
summer communities. This has resulted in the discharge of
partially and untreated sanitary waste to Cedar Creek and Lake
Erie. A sanitary hazard exists where septic tanks are located
close to private well-water supplies.

It is recommended that supervision be given to the
installation of septic tanks by local health authorities and
that pollution conditions be remedied.

TOWNSHIP OF SANDWICH EAST

Heavy pollution exists in the two main water courses
in the township that empty into the Detroit River. The pollution
is the result of many septic tank systems installed in heavy soil
with poor drainage conditions. A number of samples were obtained
from these water courses, and the results of the analyses are
noted below:

Sampling Point	Mile- age	Location	B.O.D. (p.p.m.)	Solids (p.p.m.)		Membrane Filter Coliform Count per 100 M.L. (M.P.N.)	
				Total	Susp.	Diss.	
L 1.9	1.9	Little River at Bridge on Tecumseh Rd.	25.0	316	8	308	5850
ED 9		Grand Marais Drain .25 mi. east of Alexis Rd. on Grand Marais Rd.	290	870	404	466	Less than 10
ED 10		Boundary Sand- wich East and Windsor, Wollatt Concrete Plant at Alexis Rd. and Grand Marais Rd.	144	582	336	846	110
ED 11		Walker Rd. Bridge at Grand Marais Drain.	49	356	84	272	Greater than 15,000
ED 12		Howard Ave. Bridge border of Sandwich E. and Sandwich W.	37	414	74	340	Greater than 15,000

The control of pollution and elimination of unsanitary conditions can only be accomplished by a sewage works programme which includes the construction of sanitary sewers and a sewage treatment plant. The location of sewage treatment plant outfalls should be limited to the section of the Detroit River downstream from the water purification plants. In the interests of economical and suitable development of water supply and sewage disposal for the entire metropolitan area it is recommended that a joint sewage treatment system be constructed to serve the City of Windsor and the suburban areas with treatment at one or more plants.

TOWNSHIP OF SANDWICH WEST

Pollution conditions in the Township of Sandwich West are similar to those occurring in Sandwich East. Topographical and soil conditions are comparable. The Grand Marais Drain which originates in the Township of Sandwich East and the Lennon Drain carries pollution into Turkey Creek. The results of analyses of samples collected from watercourses in the townships are as follows:

Sampling Point	Mile-age	Location	B.O.D. (p.p.m.)	Solids (p.p.m.) Total Susp. Diss.			Membrane Filter Coliform Count per 100 M.L. (M.P.N.)
ED 13		Huron Line, South of Grand Marais Rd.	14	462	20	442	Greater than 15,000
ED 14		Elliott Rd. Bridge above Jct. with Turkey Creek	6.2	442	20	422	Greater than 15,000
ED 15		Spencer Rd. at Lennon Drain	15	538	22	516	Greater than 300
ED 16		Lennon Drain at Howard Ave.	5	594	70	524	29,200
ED 17		Grand Marais Drain South of M.C. Ry.	28	602	144	458	141,000
TN 1.9	1.9	Turkey Creek at Roseland Golf Club. Kennedy Drive west of McGregor Blvd.	4.7	392	14	378	-
TN 4.3	4.3	Turkey Creek at Huron Line Rd. Bridge at (Hwy No. 3)	6.0	404	4	400	Less than 10
TS 5.0	5.0	Hwy. No. 3 below 0.5 mi. Turkey Creek	4.2	380	32	348	565

The sample results indicate that pollution was present at all the sampling points.

Sanitary sewers and package sewage treatment plants have been recently constructed to serve two large housing developments and a shopping centre. This is a first step in a necessary programme of sewage works construction to control pollution conditions in the township. These plants serve a limited area only and will be abandoned when an overall programme of sewage works is undertaken.

It is recommended that the construction of sewage works to serve the Township of Sandwich West be undertaken jointly with the City of Windsor and the other suburban areas for treatment at one or more plants.

TOWNSHIP OF TILBURY NORTH

Stoney Point

The disposal of domestic sewage in the Police Village of Stoney Point is carried out by septic tank systems. Surface water is drained from the area to Lake St. Clair by means of a municipal drain. A number of analyses have indicated the presence of sanitary sewage and industrial waste in this drain. The results of these analyses are given below:

Location	B.O.D. (p.p.m.)	Solids (p.p.m.)			Membrane Filter Coliform Count per 100 M.L. (M.P.N.)
		Total	Susp.	Diss.	
Municipal Drain 100 ft. North of Hwy. No. 39	15	814	92	722	-
Municipal Drain above Can. Can. Sewer Outlet	272	622	16	606	-
Can. Can. Outlet Sewer	260	232	32	190	-
Municipal Drain Near Mouth	28	558	202	356	440

It is recommended that action be taken to eliminate pollution from the municipal drain between lots 6 and 7. This could be accomplished by the removal of all septic tank outlets from the drain and the provision of satisfactory secondary treatment of the canning factory wastes.

LABORATORY LIBRARY



96936000118748

DATE DUE		

J| MOE/ESS/WAT/AQKO
 Ontario Water Resources Co
 Report on a water
 resources survey County aqko
 of Essex c.2 a aa



Environment Ontario
 Library
 125 Hurontario Rd.
 Etobicoke, Ontario M9P 3V6
 Canada
 LABORATORY LIBRARY

ONTARIO WATER RESOURCES COMMISSION